according to embodiments. The current sensors allow for sensing current changes within the electrodes. For example, when a finger touches the first conductive layer at a point equidistant to each of the first electrodes, a current through all of the electrodes is equal and thus it may be concluded that the finger touches the first conductive layer at a point equidistant to all of the electrodes. For example, when the current through one of the electrodes is higher than through another one, it may be concluded that the first conductive layer was touched closer to the electrode where the higher current is sensed. By sensing the currents of all electrodes of the first conductive layer, the exact position of touching the first conductive layer may be deduced.

[0019] In order to allow resistive touch sensing using the second electrodes with little wiring needs, embodiments provide the second electrodes as only one electrode. The second electrode may be positioned on the first conductive layer and may sense a current induced onto the first conductive layer by the potential of the second conductive layer, when the two conductive layers are brought into physical contact.

[0020] In order to avoid interferences between the capacitive touch sensing of the first electrodes and the resistive touch sensing of the second electrode, embodiments provide arranging the second electrode spatially apart from the first electrodes on the first conductive layer. Another possibility to avoid interferences may be to provide for algorithms which discriminate between the signals of resistive touch sensing and capacitive touch sensing. The signals applied onto the layers for the two types of sensing may differ in structure, allowing discriminating these from each other.

[0021] Improved measurement of the current induced by the second conductive layer onto the first conductive layer is possible, when the second electrode is arranged on an edge of the first electrode, according to embodiments. Arranging the electrodes on the corners and edges may allow for the spacer to isolate the first and second electrodes from the third electrodes as well as the first conductive layer from the second conductive layer. The spacer may be arranged, such that it is at least spatially located at the positions of the first, second and third electrodes in between the first and second conductive layers.

[0022] According to embodiments, the second electrodes connected to a second current sensor are arranged for sensing a voltage applied by the third electrodes on the second conductive layer upon contact between the first and the second conductive layer. The second current sensors may measure a voltage applied from the second conductive layer onto the first conductive layer through the third and second electrodes. On the second conductive layer, the potential applied by the third electrodes has a gradient from at least one of the electrodes to at least another of the electrodes. Thus, equipotential lines, orthogonal to the field lines on the second conductive layer, define planes of equal potential. By these equipotential lines, distances between electrodes of different potential on the second conductive layer may be defined.

[0023] In order to provide for an electric field on the second conductive layer, which allows precise position detection, embodiments provide for arranging the third electrodes at opposing positions on the second conductive layer. A second electrode may be comprised of one electrode arranged on an edge of the first conductive layer. For capacitive touch sensing, the at least four electrodes on the first conductive layer need to be connected with sensors resulting in at least four wires. The resistive touch sensing requires the second and third electrodes to be connected to sensors, resulting in additional at least five wires. It may be possible to use the second electrodes for both capacitive and resistive touch detection. Capacitive and resistive touch sensing according to embodiments of the application may require at least nine wires to be connected to sensors.

[0024] According to embodiments, the second electrodes may be connected to first current sensors arranged for sensing current changes within the electrodes. The second electrodes may be used for capacitive and resistive touch detection. The second electrodes may be part of the first electrode. The second electrodes may be at least one of the first electrodes.

[0025] According to embodiments, the first electrodeor the second electrode or both the first electrode and the second electrode may be connected to sensors arranged for selectively sensing either current changes within the electrodes or a voltage applied by the third electrodes on the second conductive layer upon contact between the first and the second conductive layer. Switching, sequencing or the like between sensing either current changes within the electrodes or a voltage applied by the third electrodes on the second conductive layer upon contact between the first and the second conductive layer allows for using at least the second electrodes for both capacitive and resistive touch sensing.

[0026] According to embodiments, the first conductive layer is larger than the second conductive layer, such that the area of capacitive touch sensing overlaps the area of resistive touch sensing. In this case it may be required that the resistive input is wanted only on the display area. Capacitive measurement may still be extended outside the display area to provide additional slider or button functionalities.

[0027] In order to allow conductive and resistive measurements throughout the whole surface of the first and second conductive layers, embodiments provide the first and second conductive layers with equal forms.

[0028] For resistive position detection, it is necessary to measure the position of a point of contact between the first and second conductive layer. This can, for example, be done by measuring first a position of the point of contact in a first direction, i.e. the x-direction, and subsequently in a second direction, i.e. the y-direction. For this reason, it may be favorable to first supply a first set of third electrodes with a first voltage and a second set of third electrodes with a second voltage, e.g. a mass, ground or common potential. For example, the first set of electrodes of the third electrodes may be arranged in corners at one edge of the second conductive layer and the second set of electrodes may be arranged at the opposing edge of the second conductive layer. Then, equipotential lines, orthogonal to the field lines between the electrodes, define a distance of the point of contact and first set and second set of electrodes. This may allow measuring position in the x-direction. Supplying temporally succeedingly another set of electrodes, being arranged on edges orthogonal to the edges of the first sets of electrodes with the same voltages allows for measuring the point of contact in the y-direction. When switching between the sets of electrodes being arranged on edges in the y-direction and sets of electrodes being arranged in the x-direction in a temporally succeeding order, i.e. at intervals of fractions of a second, i.e. milliseconds, the x and y coordinates of the point of contact may be measured within short time.

[0029] In order to allow the field lines running substantially in the x-direction or the y-direction electrodes located at corners of first edges can be supplied with the same voltage,